Department of Transportation
Federal Aviation Administration
Office of Airworthiness
Washington, D.C.

TSO-C72c

Date 2-10-67

Technical Standard Order

Subject: TSO-C72c, INDIVIDUAL FLOTATION DEVICES

(a) Applicability.

(1) Minimum Performance Standard. This technical standard order (TSO) prescribes the minimum performance standards that individual flotation devices must meet in order to be identified with the applicable TSO marking. Individual flotation devices that are to be so identified and that are manufactured on or after the date of this TSO must meet the minimum performance standards set forth in Appendix 1, "Federal Aviation Administration Standard, Individual Flotation Devices," at the end of this section.

(2) Environmental Standard. None referenced.

(b) Marking.

(1) Each individual flotation device must be marked in accordance with Federal Aviation Regulation (FAR) § 21.607(d).

(2) The following additional information must be shown when tested to the fire blocking requirements of Appendix 1, Paragraph 7.0.3.1:

"Complies with §§ 25.853(c), effective 11/26/84."

(c) Data Requirements. In addition to FAR § 21.605, the manufacturer must furnish the Manager, Aircraft Certification Office (ACO), Federal Aviation Administration (FAA), having purview of the manufacturer's facilities, one copy of the following technical data:

(1) The descriptive information on the device.

(2) The manufacturer's equipment operating instructions and limitations,

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(3) The applicable installation instructions indicating any or other conditions pertinent to installation.

(4) The manufacturer's test report of results of tests required by Appendix 1, Paragraph 7.0.

(5) The manufacturer's special cleaning and maintenance instructions.

(6) When testing is conducted to the fire blocking requirements of Appendix 1, Paragraph 7.0.3.1, a report containing the test results must be submitted.

William Fullerton

Acting Director of Airworthiness

FEDERAL AVIATION ADMINISTRATION STANDARD

Individual Flotation Devices

1.0 Purpose.

To specify minimum performance standards for individual flotation devices other than life preservers defined in the TSO-C13 Series.

2.0 Types and Description of Devices.

This standard provides for the following two categories of individual flotation devices:

a. Inflatable types (compressed gas inflation).
b. Noninflatable types.

2.0.1 Description of Inflatable Types. Inflation must be accomplished by release of a compressed gas contained in a cartridge into the inflation chamber. The cartridge must be activated by a means readily accessible and clearly marked for its intended purpose. The flotation chamber must also be capable of oral inflation in the event of failure of the gas cartridge.

2.0.2 Description of Noninflatable Types. Seat cushions, head rests, arm rests, pillows, or similar aircraft equipment are eligible as flotation devices under this standard provided they fulfill minimum requirements for safety and performance. Compression through extended service use, perspiration and periodic cleaning must not reduce the buoyancy characteristics of these devices below the minimum level prescribed in this standard.

2.1 Instructions for Use. Where the design features of the device relative to its purpose and proper use are not obvious to the user, clear instructions must be visible under conditions of emergency lighting.

3.0 Definitions.

The following are definitions of terms used throughout the standard:

a. Buoyancy. The amount of weight a device can support in fresh water at 85 F.

b. Flame Resistant. Not susceptible to combustion to the point of propagating a flame beyond safe limits after the ignition source is removed.

c. Corrosion Resistant. Not subject to deterioration or loss of strength as a result of prolonged exposure to a humid atmosphere.

4.0 General Requirements.

4.0.1 Materials and Processes. Materials used in the finished product must [illegible] experience and tests have demonstrated to be suitable for the use intended throughout the service life of the device. The materials and process must conform to specifications selected or prepared by the manufacturer which will insure that the performance, strength and durability incorporated in the prototype are continued or exceeded in subsequently produced articles.

4.0.2 Fungus Protection. Materials used in the finished product must contain no nutrient which will support fungus growth unless such materials are suitably treated to prevent such growth.

4.0.3 Corrosion Protection. Metallic parts exposed to the atmosphere must be corrosion resistant or protected against corrosion.

4.0.4 Fire Protection. If the device is not used as part of a seat or berth, materials used in the device, including any covering, must meet Paragraph 6.0.2 of this standard. If the device is to be used as part of a seat or berth, all materials used in the device must meet Paragraph 7.0.3 of this standard,

4.0.5 Temperature Range. Materials used in the construction of the device must be suitable for the intended purpose following extended exposures through a range of operating temperatures from -40° F. to +140° F.

4.1 Design and Construction.

4.1.1 General. The design of the device, the inflation means if provided, and straps or other accessories provided for the purpose of donning by the user must be simple and obvious thereby making its purpose and actual use immediately evident to the user.

4.1.2 Miscellaneous Design Features. The devices must be adaptable for children as well as adults. The devices must have features which enable the users to retain them when jumping into water from a height of at least 5 feet. Attachment straps must not pass between the user's leg for retention or restrict breathing or blood circulation.

5.0 Performance Characteristics.

5.0.1 Buoyancy Standard. The device must be shown by the tests specified in paragraph 7.0.1 to be capable of providing not less than 14 pounds of buoyancy in fresh water at 85° F. for a period of 8 hours.

5.0.2 Utilization. The device must be capable of being utilized by the intended user with ease.

5.0.3 Function Under Temperature Limits. The device must function from -40° F. to +140° F.

6.0 Standard Tests.

6.0.1 Salt Spray Test Solution. The salt used must be sodium chloride or equivalent containing on the dry basis not more than 0.1 percent of sodium iodide and not more than 0.2 percent of impurities. The solution must be prepared by dissolving 20 +2 parts by weight of salt in 80 parts by weight of distilled or other water containing not more than 200 parts per million of total solids. The solution must be kept free from solids by filtration decantation, or any other suitable means. The solution must be adjusted to be maintained at a specific gravity of from 1.126 to 1.157 and a pH of between 6.5 and 7.2 when measured at a temperature in the exposure zone maintained at 95° F.

6.0.2 Flame Resistance. Except for devices required to be tested in accordance with 7.0.3 the following applies: Three specimens approximately 4 inches wide and 14 inches long must be tested. Each specimen must be clamped in a metal frame so that the two long edges and one end are held securely. The frame must be such that the exposed area of the specimen is at least 2 inches wide and 13 inches long with the free end at least 1/2 inch from the end of the frame for ignition purposes. In case of fabrics, the direction of the weave corresponding to the most critical burn rate must be parallel to the 14-inch dimension. A minimum of 10 inches of the specimen must be used for timing purposes, and approximately 1 1/2 inches must burn before the burning front reaches the timing zone. The specimen must be long enough so that the timing is stopped at least 1 inch before the burning front reaches the end of the exposed area.

The specimens must be supported horizontally and tested in draft free conditions. The surface that will be exposed when installed in the aircraft must face dawn for the test. The specimens must be ignited by the Bunsen or Tirrell burner. To be acceptable, the average burn rate of the 3 specimens must not exceed 4 inches per minute. Alternatively, if the specimens do not support combustion after the ignition flame is applied for 15 seconds or if the flame extinguishes itself and any subsequent burning without a flame does not extend into the undamaged areas, the material is also acceptable.

7.0 Test Requirements.

7.0.1 Buoyancy Testing. The flotation device, including all dress p@vrovC. f-fre ... Bwav (if used) and straps that would normally be used by a survivor in an emergency, must be tested in accordance with either s&paragraph (a) or (b) of this paragraph, as applicable, or an equivalent test procedure. The test may be conducted using nonfresh water8 or at a temperature other than 85° F., or both, provided the result can be converted to the standard water condition specified in Paragraph 5.0.1. The test may be conducted in open (ocean or lake) or restricted (swimming pool) water. The test specimen of noninflatable devices, such as pillows or seat cushions, must either be preconditioned to simulate any detrimental effects on buoyancy resulting from extended service or an increment must be added to buoyancy standard in Paragraph 5.0.1 sufficient of offset any reduction in buoyancy which would result from extended service use.

a. Test Procedures Applicable to Inflatable 'Device and to Noninflatable Devices made f ran Closed Cell Material. The device must be tested by submerging it in water so that no part of it is less than 24 inches below the surface. It must be shown that the buoyancy of thedevice is at least equal to the value specified in paragraph 5.0.1 after submersion for at least 8 hours, except that the test may be discontinued in less than 8 hours if buoyancy measurements taken at 4 successive 30 minutes intends show that the buoyancy of the device has stabilized at a value at least equal to the value specified in Paragraph 5.0.1.

b. Test Procedures Applicable to Noninflatable Devices made from Open Cell Material. The device must be completely submerged and must either support a human subject of be attached to a mechanical apparatus that simulates the movements characteristic of a nonswimmer. During the test, the device must be subjected to a squeezing action comparable to that caused by the movements characteristic of a nonswimmer. It must be shown that the buoyancy of the device is at least equal to the value specified in Paragraph 5.0.1 after testing for at least 8 hours, except that the test may be discontinued in less than 8 hours if the buoyancy measurements taken at 4 successive 30-minute intervals show that the buoyancy of the device has stabilized at a value at Beast equal to the value specified in Paragraph 5.0.1.

7.0.2 Salt Spray Testing- All metallic operating parts must be placed in an enclosed chamber and sprayed with an atomized salt solution for a period of 24 hours. The solution must be atomized in the chamber at a rate of 3 quarts per 10 cubic feet of chamber volume per 24-hour period. At the end of the test period, it must be demonstrated that the parts operate properly.

7.0.3 Test for Fire Protection of Materials. Materials used in flotation devices that are to be used as part of a transport category aircraft seat or berth must comply with the self-extinguishing fire protection provisions of § 25.853(b) of FAR Part 25. In all other applications, the materials in the flotation devices must be tested in accordance with Paragraph 6.0.2 of this standard to substantiate adequate flame resistant properties.

7.0.3.1 Test for Fire Blocking of Seat Cushions (optional). Tests must be conducted in accordance with Appendix F, Part II of FAR Part 25.

7.0.4 Extreme Temperature Testing. Tests must be performed to demonstrate that the device is operable throughout the temperature range specified in Paragraph 5.0.3. In performing these tests, preconditioning of test specimens must be accomplished to simulate conditions of immediate use of the device following an aircraft takeoff.

Note: An acceptable procedure for preconditioning may involve storage of the device for 8 hours at the extreme temperatures specified, followed by exposure to room temperature conditions for a period of time not to exceed 10 minutes.